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REMARKS

Claims 18-61 are pending. The specification has been amended to update the reference to copending applications that have subsequently issued. By this Amendment, claim 55 is canceled and claims 39 and 56-61 are amended to more particularly point out their claimed invention. Claim 61 was amended to incorporate the features of independent claim 55 to write claim 61 in independent form. Claims 56-60 are amended to change the claim dependency in view of the cancellation of claim 55 and the rewriting of claim 61 as an independent claim. The amendments are not intended to narrow the scope of claims 56-61. The amendment of claim 39 is supported by the specification, for example, at page 5, lines 18-24. No new matter is introduced by the amendments.

Claims 18-61 stand rejected. Applicants respectfully request reconsideration of the rejections based on the following comments.

Rejection Under 35 U.S.C. § 102

The Examiner rejected claims 55-58 and 60 under 35 U.S.C. § 102(b) as being anticipated by PCT application WO 99/23189 to Kambe (the Kambe application). The Examiner asserts that the collection chamber that collects the particles on a filter reads on depositing the particles on a substrate. However, the Kambe application does not disclose the claimed deposition rate. Nevertheless, Applicants have canceled claim 55, and converted claim 61 into an independent claim from which claims 56-58 and claim 60 now depend. In view of the cancellation of claim 55 and the change in dependency of claims 56-58 and 60, the present rejection is moot. Applicants respectfully request withdrawal of the rejection of claims 55-58 and 60 under 35 U.S.C. § 102(b) as being anticipated by the Kambe application.

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Rejections Over Akedo et al., Bi et al. and Rao et al.

The Examiner rejected claims 18-29, 33-42, 44, 46-51, 55-57 and 59-61 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,280,802 to Akedo et al. (the Akedo patent), in view of U.S. Patent 5,958,348 to Bi et al. (the Bi patent) and U.S. Patent 5,874,134 to Rao et al. (the Rao patent). Issues relating to the Akedo patent in view of the Bi patent have been discussed in detail prior to the issuance of the present Office Action. The Examiner cited the Rao patent for disclosing the motivation for combining the Akedo patent and the Bi patent along with the teaching of how to combine the disclosures of the Akedo patent and the Bi patent. However, the Rao patent teaches away from the combination for many of the claimed embodiments and confuses rather than clarifies the combination of the disclosures in the Akedo patent and the Bi patent. Thus, the combined disclosures do not render Applicants' invention prima facie obvious. Applicants respectfully request reconsideration of the rejection based on the following comments.

Applicants incorporate by reference the discussion regarding the Akedo patent and the Bi patent from the Appeal Brief of November 19, 2002. In many ways, the attempt at combining the Rao patent with the Akedo patent and the Bi patent accentuates the lack of motivation to combine the teachings of the Akedo patent and the Bi patent. The discussion is broken down according to claim groupings based on each independent claim.

Claims 18-29 and 44

The Rao patent teaches away from the method of claim 18 and, thus, is not properly combinable with the Akedo patent and the Bi patent to lead to Applicants' claimed invention. More specifically, since the Rao patent teaches away from the claimed invention, the Rao patent certainly does not make up for the deficiencies of the Akedo patent and the Bi patent with respect to Applicants' claimed invention. The Rao patent discloses a deposition approach

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that can be based on a high temperature energy source 14. As noted at column 4, lines 23-27, the high temperature energy source can be a high energy laser. However, referring to the figures, such as Fig. 1, the energy source 14, such as the laser, directs energy **along the flow**. Referring to Fig. 1, the reactants enter the chamber and are entrained in the plasma gas flow to flow through the ceramic nozzle 16 from left to right toward the substrate 22.

In contrast, Applicants' claimed method specifies that the product particles are located **downstream from the radiation beam**, implying that the radiation beam is at an angle to the flow toward the substrate. The Rao patent **teaches away** from this reaction configuration by teaching the radiation beam oriented toward the substrate. Since the Rao patent teaches away from Applicants' claimed invention, the Rao patent does not make up for the deficiencies of the Akedo patent and the Bi patent with respect to the claimed invention. **This teaching away in the Rao patent accentuates that the Akedo patent and the Bi patent do not themselves teach how to combine their disclosures to form Applicants' claimed invention.** The combined disclosures of the Akedo patent, the Bi patent and the Rao patent clearly do not render Applicants' claimed invention prima facie obvious.

#### Claims 33-38 and 46-51

With respect to these claims, a reactant stream is formed that is elongated along a cross section of the flow in one dimension relative to the perpendicular direction. The Rao patent discloses a circular nozzle. Since the orientations of the embodiments shown in the Rao patent and the Bi patent are completely different, there is no teaching in the references how to combine the disclosures to form Applicants' claimed invention with an elongated reactant flow. Furthermore, the differences between the construction of the Rao apparatus and the Bi apparatus further complicate any attempt at combining the teachings of the Akedo patent and the Bi patent. In particular, if an elongated flow of the Bi patent is directed toward the substrate as in the Rao

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apparatus, the laser would only intersect a small portion of the flow if oriented as described in the Rao patent. Since the combination does not seem functional, the combined disclosures of the Akedo patent, the Bi patent and the Rao patent do not render Applicants' claims prima facie obvious.

#### Claims 39-41

The cited reference must teach or suggest all claim elements to render a claim prima facie obvious. See, for example, MPEP 2143.03. Claim 39 specifies that the substrate has a diameter greater than about 5 centimeters. The Rao patent discloses a substrate with a 2 centimeter diameter. See column 6, lines 65-67. The Akedo patent does not disclose the substrate size, although the nozzle is disclosed as having a dimension of 1 centimeter (10 mm) by 0.04 centimeters (0.4 mm) at column 12, lines 7-10. The Bi patent does not disclose a substrate size. Therefore, the Examiner has not asserted a prima facie case for obviousness.

Furthermore, as described above, the references do not motivate their combination, nor do they teach how to form the combination based on their disparate disclosures.

Since the cited references do not disclose all of the claim elements and since there is no motivation to combine the references to form Applicants' claimed invention, the combined teachings of the Akedo patent, the Bi patent and the Rao patent do not render Applicants' claimed invention prima facie obvious.

#### Claim 42

Claim 42 is directed toward a method involving simultaneously generating multiple product streams and depositing these multiple product stream simultaneously on a substrate. None of the references teach or suggest the simultaneous formation of different

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product streams. Since the references alone or together do not teach all of the elements of the claimed invention, the references do not render the claimed invention prima facie obvious.

#### Claims 55-57 and 59-61

To advance prosecution of the application, Applicants have canceled claim 55 and rewritten claim 61 as an independent claim. The Akedo patent does not teach or suggest particle production and coating formation without collecting the particles. The Bi patent does not describe the particle production rate and does not teach a substrate in which the substrate does not permit gas to pass through. Since the Bi patent is directed to particle collection, the Bi patent teaches away from substrates that do not permit gas to flow through. The Rao patent does not specify the rate of particle deposition, but based on the coating formation rate at column 7, lines 33-41, the deposition rate would seem to be significantly less than 5 grams per hour. Since there is no motivation or teaching how to combine the disclosures and since the references do not teach the deposition of at least 5 grams per hour onto a substrate that does not allow gas to flow through, the combined disclosures of the references do not render Applicants' claimed invention prima facie obvious.

#### Summary

In view of the above remarks, the combined disclosures of the Akedo patent, the Bi patent and the Rao patent do not render Applicants' claimed invention prima facie obvious. While Applicants do not acquiesce in the Examiners' statements regarding additional features of Applicants' claimed invention, these additional statements are presently moot in view of the above comments. Applicants respectfully request withdrawal of the rejection of claims 18-29, 33-42, 44, 46-51, 55-57 and 59-61 under 35 U.S.C. § 103(a) as being unpatentable over the Akedo patent, in view of the Bi patent and the Rao patent.

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Rejection Over Lehman, Akedo et al., Bi et al., Rao et al. and Kambe et al.

The Examiner rejected claims 30, 43, 45, 52 and 58 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,097,144 to Lehman (the Lehman patent) in view of the Akedo patent, the Bi patent and the Rao patent, further in view of the Kambe application. The Examiner cited the Lehman patent for its disclosure relating to glass coatings. The deficiencies of the combined disclosures of the Akedo patent, the Bi patent and the Rao patent with respect to Applicants' claimed invention were described in detail above. Applicants maintain that the combined disclosures of the references do not render Applicants' claimed invention *prima facie* obvious. Applicants respectfully request reconsideration of the rejection based on the following comments.

The present claims depend from claims whose patentability over the Akedo patent, the Bi patent and the Rao patent was discussed above. In particular, with respect to claims depending from claim 18, it was noted that the Rao patent taught away from Applicants' claimed invention such that it did not support the combination of the Akedo patent and the Bi patent. With respect to claims depending from claim 33, the Rao patent discloses a circular nozzle with a substantially different orientation than shown in the particle production apparatus in the Bi patent such that the combined disclosures of the references do not lead to Applicants' claimed invention. With respect to claims depending from claim 39, the cited references do not teach the claimed substrate sizes. With respect to claims depending from claim 55, the Akedo patent, the Bi patent and the Rao patent do not teach or suggest deposition rates of at least 5 grams per hour onto a substrate that does not allow gas to flow through.

While the Kambe application discloses silicon oxide particles formed by laser pyrolysis, the apparatus and corresponding methodology in the Kambe application is similar to the corresponding apparatuses and methods in the Bi patent. Thus, the Kambe application does

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not make up for the deficiencies of the Akedo patent, the Bi patent and the Rao patent with respect to Applicants' claimed invention.

The Lehman patent does not teach or suggest particle production or particle deposition. Thus, the Lehman patent clearly does not make up for the deficiencies of the Akedo patent, the Bi patent and the Rao patent with respect to Applicants' claimed invention. In view of the above, the combined disclosures of the Lehman patent, the Akedo patent, the Bi patent, the Rao patent and the Kambe application does not render Applicants' claimed invention prima facie obvious.

While Applicants do not acquiesce in the Examiners' statements regarding additional features of Applicants' claimed invention, these additional statements are presently moot in view of the above comments. Applicants respectfully request withdrawal of the rejection of claims 30, 43, 45, 52 and 58 under 35 U.S.C. § 103(a) as being unpatentable over the Lehman patent in view of the Akedo patent, the Bi patent and the Rao patent, further in view of the Kambe application.

Rejections Over Akedo et al., Kambe et al., and Rao et al.

The Examiner rejected claims 18-29, 33-52 and 55-61 under 35 U.S.C. §103(a) as being unpatentable over the Akedo patent in view of the Kambe application and the Rao patent. All the relevant independent claims of this rejection were discussed above in the context of the rejection over the Akedo patent, the Bi patent and the Rao patent. The apparatus and methodology in the Kambe application are comparable to the corresponding apparatus and methodology in the Bi patent. Therefore, the arguments above relating to the Akedo patent, the Bi patent and the Rao patent apply equally to the combined disclosures of the Akedo patent, the Kambe application and the Rao patent. Since the combined disclosures of the Akedo patent, the Bi patent and the Rao patent do not render Applicants' claimed invention prima facie obvious,

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the combined disclosures of the Akedo patent, the Kambe application and the Rao patent do not render Applicants' claimed invention prima facie obvious for the reasons discussed in detail above.

While Applicants do not acquiesce in the Examiners' statements regarding additional features of Applicants' claimed invention, these additional statements are presently moot in view of the above comments. Applicants respectfully request withdrawal of the rejection of claims 18-29, 33-52 and 55-61 under 35 U.S.C. §103(a) as being unpatentable over the Akedo patent in view of the Kambe application and the Rao patent.

Rejection Over Lehman, Akedo et al., Kambe et al. and Rao et al.

The Examiner rejected claim 30 under 35 U.S.C. §103(a) as being unpatentable over the Lehman patent in view of the Akedo patent, the Kambe application and the Rao patent. Claim 30 depends from claim 18. The Lehman patent does not teach or suggest particle formation or particle deposition. Therefore, the Lehman patent does not make up for the deficiencies of the combined disclosures of the Akedo patent, the Kambe application and the Rao patent with respect to claim 18 and correspondingly claim 30. Since the combined disclosures of the cited references do not render claim 30 prima facie obvious, Applicants respectfully request withdrawal of the rejection of claim 30 under 35 U.S.C. §103(a) as being unpatentable over the Lehman patent in view of the Akedo patent, the Kambe application and the Rao patent. While Applicants do not acquiesce in the Examiners' statements regarding additional features of Applicants' claimed invention, these additional statements are presently moot in view of the above comments.



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Rejection Over Tran et al., Lehman, Akedo et al., Bi et al., Rao et al. and Kambe et al.

The Examiner rejected claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over U.S. patent 6,074,888 to Tran et al. (the Tran patent) in view of the Lehman patent and further in view of the Akedo patent, the Bi patent and the Rao patent, in view of the Kambe application. The Examiner cited the Tran patent for disclosing optical components. Claims 31 and 32 depend from claim 18. Above, it was noted that the Rao patent teaches away from Applicants' claimed invention such that the combined disclosures of the Akedo patent, the Bi patent and the Rao patent do not render claim 18 prima facie obvious. Furthermore, it was noted that the Kambe application and the Lehman patent do not make up for the deficiencies of the Akedo patent, the Bi patent and the Rao patent with respect to teaching the subject matter of claim 18. The Tran patent refers to "known epitaxy techniques" for depositing optical materials. See, for example, column 3, lines 24-27. The Tran patent does not teach deposition approaches that make up for the deficiencies of combining the teachings of the Akedo patent, the Bi patent and the Rao patent to obtain Applicants' claimed invention. Thus, the combined disclosures of the Tran patent, the Lehman patent, the Akedo patent, the Bi patent, the Rao patent and the Kambe application do not render Applicants' claimed invention prima facie obvious.

While Applicants do not acquiesce in the Examiners' statements regarding additional features of Applicants' claimed invention, these additional statements are presently moot in view of the above comments. Applicants respectfully request withdrawal of the rejection of claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over the Tran patent in view of the Lehman patent and further in view of the Akedo patent, the Bi patent and the Rao patent, in view of the Kambe application.

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Rejection Over Tran et al., Lehman, Akedo et al., Kambe et al., Rao et al.

The Examiner rejected claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over the Tran patent in view of the Lehman patent and further in view of the Akedo patent, the Kambe application and the Rao patent. As noted above, the combined disclosures of the Tran patent, the Lehman patent, the Akedo patent, the Bi patent, the Rao patent and the Kambe application do not render claims 31 and 32 prima facie obvious. For the same reasons, the combined disclosures of the Tran patent, the Lehman patent, the Akedo patent, the Kambe application and the Rao patent do not render claims 31 and 32 prima facie obvious. Applicants respectfully request withdrawal of the rejection of claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over the Tran patent in view of the Lehman patent and further in view of the Akedo patent, the Kambe application and the Rao patent.

Rejection Over Börner et al., Bi et al. and Rao et al.

The Examiner rejected claims 18-29, 33-42, 47-51, 53-57 and 59-61 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,032,871 to Börner et al. (the Börner patent) in view of the Bi patent and the Rao patent. Issues relating to the Börner patent in view of the Bi patent have been discussed in detail prior to the issuance of the present Office Action. The Examiner cited the Rao patent for disclosing the motivation for combining the Börner patent and the Bi patent along with the teaching of how to combine the disclosures of the Börner patent and the Bi patent. However, the Rao patent teaches away from the combination for many of the claimed embodiments and confuses rather than clarifies the combination of the disclosures in the Börner patent and the Bi patent. Thus, the combined disclosures do not render Applicants' invention prima facie obvious. Applicants respectfully request reconsideration of the rejection based on the following comments.

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Applicants incorporate by reference their discussions of the Börner patent and the Bi patent from the Appeal Brief of November 19, 2003. Also, the deficiencies of the Rao patent have been discussed in detail above with respect to the combined teachings of the Akedo patent, the Bi patent and the Rao patent. Many of the explicit deficiencies of the Rao patent described above follow with respect to the combination of the Börner patent, the Bi patent and the Rao patent and are here.

With respect to claims 42, 53 and 54, Applicants note that the Rao apparatus operates under low pressures. According to Table 1, the maximum chamber pressure is 1000 Pa, i.e., 0.01 atmospheres or 7.5 Torr. On the other hand, the Börner apparatus seems to operate at atmospheric pressure. As noted above, the orientation of the flow and laser beam are very different in the Bi patent and the Börner patent. Thus, there is no teaching in the references how to combine these very different disclosures to form Applicants' presently claimed invention. The deficiencies with respect to the other claims follow from the discussion of the Akedo patent, the Bi patent and the Rao patent. Thus, the combined teachings of the Börner patent, the Bi patent and the Rao patent do not render Applicants' invention prima facie obvious. Applicants respectfully request withdrawal of the rejection of claims 18-29, 33-42, 47-51, 53-57 and 59-61 under 35 U.S.C. §103(a) as being unpatentable over the Börner patent in view of the Bi patent and the Rao patent.

Rejection Over Börner et al., Akedo et al., Bi et al. and Rao et al.

The Examiner rejected claims 42-54 under 35 U.S.C. §103(a) as being unpatentable over the Börner patent, in view of the Akedo patent, the Bi patent and the Rao patent. The Examiner cites the Börner patent for teaching two differently charged particle streams. The Examiner asserts that the Börner patent motivates the combination of two "Akedo and Bi" apparatuses to provide each stream. However, as discussed in detail above and in the

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Appeal Brief of November 19, 2002, the cited references do not teach an "Akedo and Bi" apparatus and the Rao patent teaches nothing to lead to an "Akedo and Bi" apparatus. Since the combined disclosures of the cited references do not lead to an "Akedo and Bi" apparatus, they certainly do not lead to two such apparatuses. Thus, the combined teachings of the Börner patent, the Akedo patent, the Bi patent and the Rao patent do not render Applicants' claimed invention prima facie obvious. Applicants respectfully request withdrawal of the rejection of claims 42-54 under 35 U.S.C. §103(a) as being unpatentable over the Börner patent, in view of the Akedo patent, the Bi patent and the Rao patent.

Rejection Over Rao et al. and Bernecki et al.

The Examiner rejected claims 18-20, 23, 25, 27-29, 39-41, 55, 56 and 58-61 under 35 U.S.C. §103(a) as being unpatentable over the Rao patent in view of U.S. Patent 5,744,777 to Bernecki et al. (the Bernecki patent). The Examiner asserts that the Rao patent teaches Applicants' claimed methods except for teaching a moving substrate. The Examiner cited the Bernecki patent disclosing coating a larger substrate by moving a plasma spray relative to the substrate. However, the cited references do not teach or suggest all of the features of Applicants' claimed inventions. Thus, the cited references do not render Applicants' claimed invention prima facie obvious. Applicants respectfully request reconsideration of the rejections based on the following comments. Applicants organize their comments according to claim groups based on the independent claims.

Claims 18-20, 23, 25 and 27-29

As noted above, the Rao patent teaches away from Applicants' claim 18. In particular, the Rao patent teaches an energy source 14 oriented along the reactant flow. In contrast, Applicants' claimed invention is directed to a product stream down stream from the

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radiation beam. Also, the Bernecki patent does not disclose particle production. In the Bernecki apparatus, the powder is fed into the flow from a conventional powder feed hopper 26. Thus, the Bernecki patent does not make up for the deficiencies of the Rao patent. Since the cited references alone or together do not teach or suggest all of the features of Applicants' claimed invention, the combined disclosures of the Rao patent and the Bernecki patent do not render claims 18-20, 23, 25 and 27-29 prima facie obvious.

#### Claims 39-41

As noted above, the Rao patent teaches a deposition rate less than 5 grams per hour. In particular, a deposition rate of 60 microns per minute over a 2 centimeter diameter substrate corresponds with about 1.2 cubic centimeters in an hour. Even if the silicon is fully compacted for a density of 2.33 grams per cubic centimeter, this corresponds only to 2.8 grams per hour. The Bernecki patent teaches away from the invention of claim 39 since the Bernecki patent teaches moving the substrate while claim 39 is directed to simultaneously depositing particles over the entire substrate surface. Furthermore, the Bernecki patent does not describe particle production or deposition rates. Since the Bernecki patent teaches away from Applicants' claimed invention and does not teach elements of the claims, the Bernecki patent does not make up for deficiencies of the Rao patent. Therefore, the combined disclosures of the Rao patent and the Bernecki do not render claims 39-41 obvious.

#### Claims 55, 56 and 58-61

Claim 55 has been canceled and claim 61 has been rewritten as an independent claim. As noted above, neither the Rao patent nor the Bernecki patent teach or suggest a deposition rate of 5 grams per hour. Since the cited references do not teach or suggest all of the

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features of the claims, the combined disclosures of the Rao patent and the Bernecki patent do not render claims 55, 61 and 58-61 prima facie obvious.

### Summary

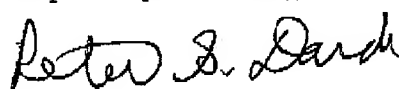
Since the combined disclosures of the Rao patent and the Bernecki patent do not render Applicants' claimed invention prima facie obvious, Applicants respectfully request withdrawal of the rejection of claims 18-20, 23, 25, 27-29, 39-41, 55, 56 and 58-61 under 35 U.S.C. §103(a) as being unpatentable over the Rao patent in view of the Bernecki patent.

### CONCLUSIONS

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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